The reptiles and amphibians of Mutawintji National Park, Western New South Wales

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ABSTRACT

The herpetofauna of Mutawintji (previously Mootwingee) National Park (31°17' S, 142°15' E) was surveyed on five occasions from 1994 to 1996. From these surveys and other sources, a total of 49 reptile species and 5 amphibian species were recorded, or probably occur in the region. Five species, now listed under the New South Wales *Threatened Species Conservation Act* 1995, were recorded during the surveys. Two of these species, *Egernia margaretae* (endangered) and *Ramphotyphlops endoterus* (endangered), were confirmed in NSW for the first time. *Egernia margaretae* and *Antaresia stimsoni* (vulnerable) were recorded only from the rocky gorges, which are a feature of the Bynguano Range in the Park, and the agamid species *Ctenophorus decresii* (endangered) and varanid *Varanus tristis tristis* were also restricted to this habitat type. Five species (*Diplodactylus steindachneri, Nephrurus levis, Lerista labialis, Ramphotyphlops endoterus* and *Brachyurophis fasciolatus* (vulnerable)) were recorded only from the adjacent red soil grasslands and shrublands, and did not occur in the gorges or on the rocky ridges.

Key words: lizards, snakes, frogs, surveys, threatened species, western NSW, Mutawintji.

Introduction

Mutawintji National Park is 130 km north east of Broken Hill in the Western Division of New South Wales, and is dominated by the Bynguano Range, which contains several gorges. There is a general paucity of herpetofaunal records for the far west of the state with many species known from only two or three localities west of the Darling River (Swan, Shea & Sadlier 2004). Mutawintji was of interest to us because of the occurrence of several species whose closest populations are in the Flinders Ranges in South Australia, and the fact that no intensive collecting had been carried out there. Accordingly, with the co-operation of the NSW National Parks & Wildlife Service (NPWS), the Australian Herpetological Society (AHS) and the South Australian Herpetology Group (SAHG) undertook surveys of Mutawintji National Park in October 1994, January 1995, April 1995, October 1995 and November 1996.

Our aims were to confirm the presence of the skink *Egernia margaretae* following an earlier tentative identification (Foster 1993), to establish if any other Flinders Ranges 'endemics' apart from *E. margaretae* and *Ctenophorus decresii* occurred in the gorges, and to compile a list of reptiles identified within the Park.

Methods

NPWS provided a list of reptiles and amphibians from the Wildlife Atlas database. The Australian Museum provided a list of specimens lodged in their reference collection from this area. These lists, and an extensive literature search, confirmed that little survey or collecting work had been carried out for reptiles and amphibians. The only publication dealing with the Park that we could locate was one written by the first Ranger, which included two pages on the reptiles and amphibians (Gerritsen 1976).

Survey Techniques

Four techniques were used to catch and identify reptiles and amphibians; pit traps, sticky traps, opportunistic collecting and spotlighting. Pit traps were 10 litre buckets sunk to ground level and placed in lines of six approximately ten metres apart. Each line was fitted with a shadecloth drift fence. A total of 11 pit trap lines were installed for varying lengths of time as set out below. The number of days the pit traps were open is indicated in parentheses. These traplines were checked early morning and again late afternoon each day.

Site	Co-ordinates	10/1994 (4 days)	1/1995	4/1995 (4 days)	10/1995	11/1996 (5 days)
1	54620/6537	X	-	X	-	X
2	54622/6537	X	-	X	-	-
3	546265/65345	X	-	X	-	-
4	54626/65344	X	-	X	-	-
5	54627/6535	X	-	-	-	-
6	546185/6537	-	-	X	-	X
7	54629/6535	-	-	X	-	-
8	546226/6547	-	-	X	-	X
9	546220/6541	-	-	X	-	X
10	54619/6537	-	-	-	-	X
11	54621/6537	-	-	-	-	X

The rocky nature and inaccessibility of the spinifex *Triodia irritans* site made pit traps impractical so an alternative method of collection was adopted. Sticky traps (Victor Mouse Glue) were placed at the base of spinifex clumps. Lizards were caught in the glue and then released by the application of vegetable oil, which dissolved the glue. Opportunistic searching of all habitats and areas occurred during the day. Spotlighting, particularly on the roads and in the Bynguano Range gorges was carried out at night.

Major sites surveyed

The surveys were carried out in the southern area of the Park centred around the Bynguano Range, adjacent rocky ridges, plains, ephemeral creek beds and adjacent flats (Figure 1). This area was chosen because of its accessibility, the gorges were known habitat for *E. margaretae* and *A. stimsoni*, and the diversity of habitats. There were no major rain events during our surveys, although showers occurred on some

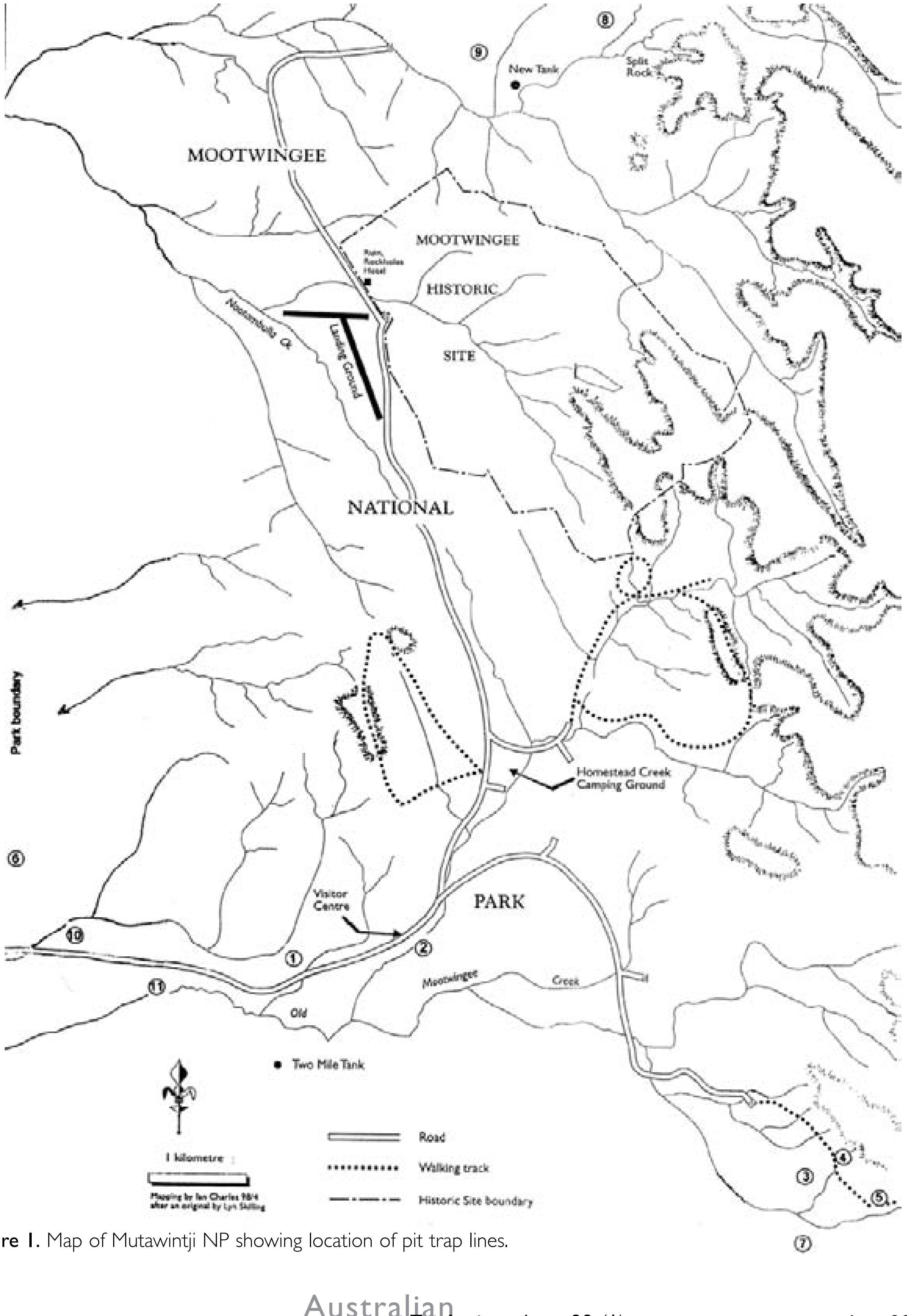
⑧
⑨
New Tank
Split Rock
MOOTWINGEE
MOOTWINGEE
Ruin, Rockholes Hotel
HISTORIC
SITE
Nootumbulla Ck
Landing Ground
NATIONAL
Park boundary
Homestead Creek Camping Ground
⑥
Visitor Centre
PARK
⑩
①
②
⑪
Mootwingee Creek
Old
Two Mile Tank
Road
Walking track
Historic Site boundary
1 kilometre
Mapping by Ian Charles 98/4 after an original by Lyn Skilling
③
④
⑤
⑦

Figure 1. Map of Mutawintji NP showing location of pit trap lines.

visits. The results of recent rain prior to the 1996 visit were evident in the large pools of water present in the gorges, and shallow pools in low lying areas on the plains.

The major habitat types surveyed were:

Gorges within the Bynguano Range (Figure 2). The main features of this area, the rocky sides and the floor of the gorges, were searched. On some occasions there were pools of water in the gorges. River Red Gums *Eucalyptus camaldulensis* lined the floor of the gorges, and grasses and shrubs were extensive.

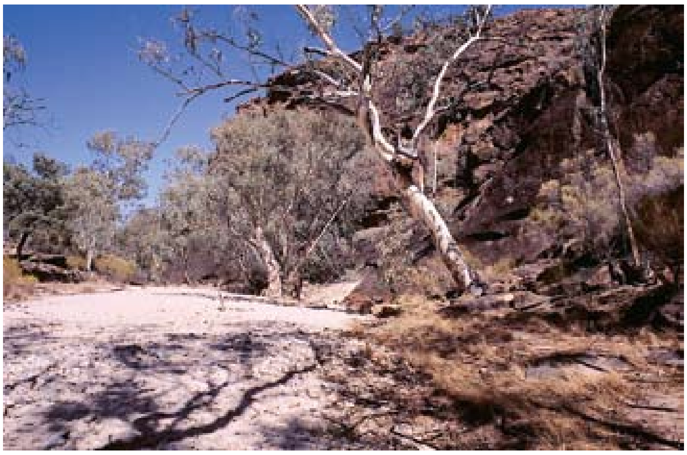

Figure 2. Homestead Gorge.

Creek beds and flats (pit trap sites 4 & 5) (Figure 3). There are several large sandy creek beds which flow out from the gorges. These did not contain water during the surveys but carried large volumes during heavy rain. River Red Gums lined these creeks and there were thickets of acacias and other shrubs. In some areas there were adjacent flats, which were susceptible to flooding from creek overflow. These usually had quite dense ground cover and scrub.

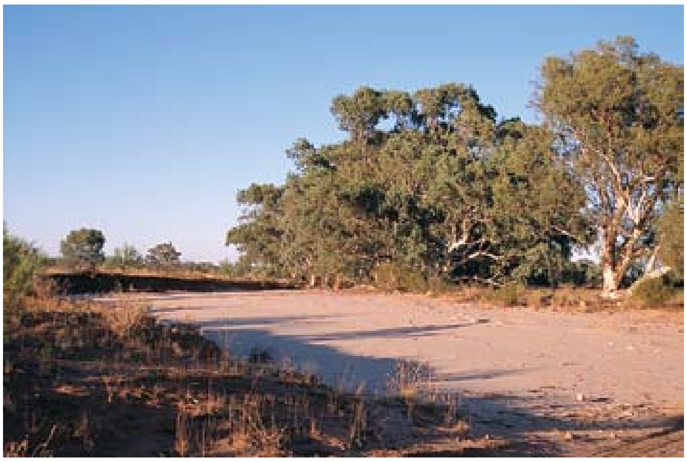

Figure 3. Dry creek bed and flats.

Rocky slopes rising out of the plains (pit trap site 7) (Figure 4). These were low, rocky outliers of the main range. Apart from sparse grasses and forbs, some had scattered trees while others supported a more diverse vegetation.

Red soil plains surrounding the range (pit trap sites 1, 2, 3, 6, 10 & 11) (Figure 5). Some areas were predominantly grassland while in other areas acacia or other scrubs in varying densities dominated.

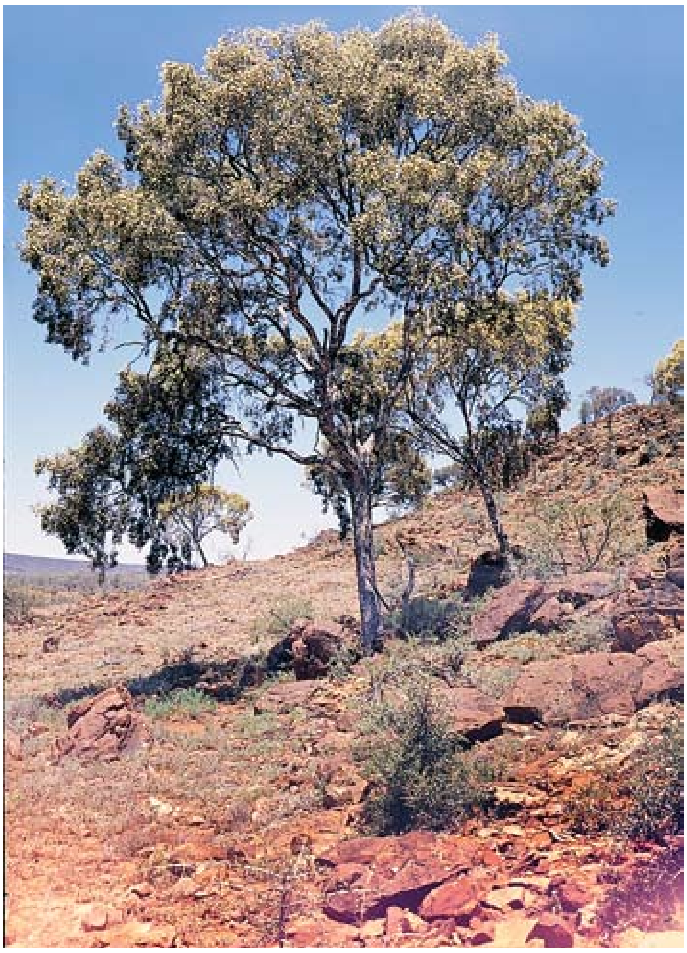

Figure 4. Rocky slope.

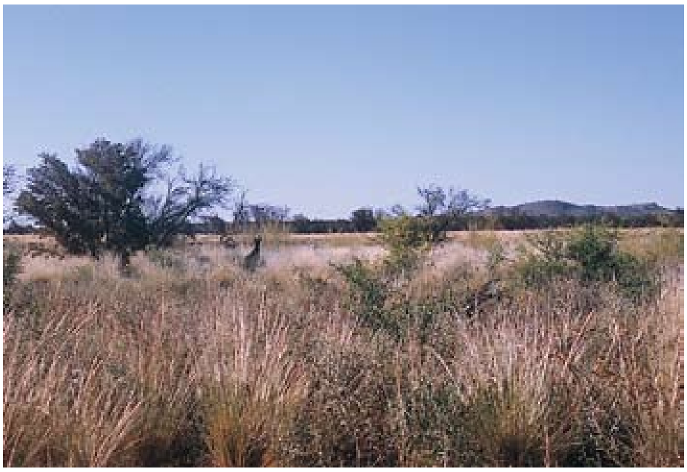

Figure 5. Red soil grasslands.

Gibber flats (pit trap site 9). These were treeless areas with sparse grasses and ground almost completely covered with small stones.

Spinifex. Only one area of spinifex was found. This was located on a rocky slope above Homestead Gorge.

Bluebush (pit trap site 8). An area of bluebush *Maireana* sp. on red rocky soil near Split Rock.

Voucher specimens were lodged with the Australian Museum for reference, and data cards were supplied to NPWS for the Wildlife Atlas database.

Results

A total of 40 reptile species and 3 amphibian species were collected or reliably identified during the course of the surveys and an additional visit by an AHS member Ken Griffiths in October 1995 (Table 1). Species caught in pit traps are set out in Table 2.

Table 3 sets out the species recorded during our survey, those listed in the NPWS Wildlife Atlas, those held in the Australian Museum reference collection, and those recorded in Gerritsen (1976).

The Australian Museum reference collection and the NPWS Wildlife Atlas database contain 2 reptile species,

Table 1. Species of reptiles and amphibians recorded by habitat and capture technique at Mutawintji NP.

	Total caught	Habitat in which captured							Capture techniques			
		G	CF	RR	RS	G	T	BB	PT	ST	OP	SL
Family Gekkonidae												
Diplodactylus byrnei	4				3	1			4			
D. damaeus	2				2							2
D. steindachneri	30				29			1	23		1	6
Gehyra variegata	39		14	8	14		2	1	3	2	18	16
Heteronotia binoei	161	46	25	28	60		2		2	2	121	36
Nephrurus levis	6				6							6
Rhynchoedura ornata	11				9			2	11			
Strophurus ciliaris	8		3		4			1	4			4
Underwoodisaurus milii	2			1	1						1	1
Family Agamidae												
Ctenophorus decresii	61	50		11							61	
C. nuchalis	8		3	1	4						8	
C. pictus	1							1			1	
Pogona vitticeps	9		2	2	4			1	1		8	
Family Varanidae												
Varanus gouldii	11	2	6		3						11	
V. tristis	6	6									6	
Family Scincidae												
Cryptoblepharus carnabyi	15	7	8						3		12	
Ctenotus brachyonyx	18	7	2	1			8			8	10	
C. leonhardii	35		1		32	1		1	23		12	
C. olympicus	3							3	3			
C. regius	34			4	29			1	14		20	
C. robustus	1		1								1	
C. schomburgkii	2				2				1		1	
C. strauchii	5	1		4							5	
Egernia margaretae	7	7									7	
E. striolata	41	37		4							41	
Lerista labialis	13				13				3		10	
L. muelleri	17	1	13	1	2						17	
L. punctatovittata	22	1	17		4				8		14	
Menetia greyii	5	2			3				3		2	
Morethia adelaidensis	1	1									1	
M. boulengeri	96	27	51		18				11		85	
Tiliqua rugosa	20			6	14						20	
Tiliqua scincoides	9	9									9	
Family Typhlopidae												
Ramphotyphlops endoterus	3				3						2	1
Family Pythonidae												

Antaresia stimsoni	2	2									2
Morelia spilota metcalfei	1	1								1	
Family Elapidae											
Brachyurophis fasciolatus	2				2					2	
Furina diadema	2		2							1	1
Pseudechis australis	3	2						1		3	
Pseudonaja nuchalis	4				4					4	
Family Hylidae											
Litoria caerulea	26	25	1							5	21
Litoria rubella	50+	50+									50+
Family Myobatrachidae											
Neobatrachus sudelli	3	1			2				1		2
Total: numbers	798+	285+	149	71	267	2	12	13	118	12	520	145+
Total: species	43	21	15	12	25	2	3	10	17	3	34	13

G = gorges; CF = creeks & flats; RR = rocky ridges; RS = red soil grasslands & shrublands; G = gibber; T = triodia; BB = blue bush. PT = pit trap; ST = sticky trap; OP = opportunistic; SL = spotlighting.

Table 2. Species caught in pit traps at Mutawintji NP.

	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	Total
Diplodactylus byrnei	3								1			4
D. steindachneri	16					2		1		1	3	23
Gehyra variegata			2					1				3
Heteronotia binoei				1							1	2
Rhyncho. ornata	1	3				3		2		2		11
Strophurus ciliaris				2				1			1	4
Crypto. carnabyi				2	1							3
Ctenotus leonhardii	4			1		7		1	1	1	8	23
C. regius	8		1					1		3	1	14
C. schomburgkii						1						1
C. olympicus								3				3
Lerista labialis		1				1					1	3
L. punctatovittata		1	2	3	2							8
Menetia greyii	1					1				1		3
Morethia boulengeri			5	5						1		11
Pogona vitticeps								1				1
Neobatrach. sudelli										1		1
Total: animals	33	5	10	14	3	15	0	11	2	10	15	118
Total: species	6	3	4	6	2	6	0	8	2	7	6	17

the numbered pit trap sites. Refer to Major sites surveyed for habitat descriptions of each site.

which were not found during the surveys. These are the Curl Snake *Suta suta* and the Prong-snouted Blind Snake *Ramphotyphlops bituberculatus*.

The NPWS Wildlife Atlas database also records another four reptile and two amphibian species from Mutawintji, although no voucher specimens are available to confirm these records. These are:

Spotted Marsh Frog *Limnodynastes tasmaniensis*. There are Australian Museum records from White Cliffs, Fowlers Gap Research Station and Sturt National Park. It is probable the species occurs in the Park.

Trilling Frog *Neobatrachus centralis*. *N. sudelli* and *N. centralis* are now regarded as synonymous, with no differences in calls, morphology or genetics (Roberts 1997). The records in the Wildlife Atlas currently assigned to *N. centralis* will no doubt be changed.

Fat-tailed Gecko *Diplodactylus conspicillatus* (endangered). If correct, this is a significant record as the only known specimens from NSW in the Australian Museum are from the Wanaaring area and Nocoleche Nature Reserve approximately 240 km to the north-east, Sturt National Park approximately 285 km to the north-west, and Paroo Darling National Park approximately 110 km to the east.

Table 3. Species of reptiles and amphibians recorded at Mutawintji NP.

	This survey	Aust Musium database	NPWS Atlas	Gerrit-sen
Family Gekkonidae				
Diplodactylus byrnei	X	X	X	
D. conspicillatus			X	
D. damaeus	X		X	
D. steindachneri	X		X	
D. tessellatus			X	
D. vittatus				X
Gehyra variegata	X	X	X	
Heteronotia binoei	X	X	X	
Nephrurus levis	X		X	
Rhynchoedura ornata	X		X	
Strophurus ciliaris	X		X	
Underwoodisaurus milii	X		X	
Family Agamidae				
Ctenophorus decresii	X	X	X	
C. nuchalis	X	X	X	
C. pictus	X		X	
Pogona vitticeps	X	X	X	
Family Varanidae				
Varanus gouldii	X		X	
V. tristis	X	X		
Family Scincidae				
Cryptoblepharus carnabyi	X	X	X	
Ctenotus brachyonyx	X			
C. leonhardii	X		X	
C. olympicus	X		X	
C. regius	X	X	X	
C. robustus	X			
C. schomburgkii	X		X	
C. strauchii	X	X	X	
Egernia margaretae	X			
E. striolata	X	X	X	
Eremiascincus fasciolatus			X	
Lerista labialis	X	X	X	
L. muelleri	X	X		
L. punctatovittata	X	X		
Menetia greyii	X		X	
Morethia adelaidensis	X			
M. boulengeri	X	X	X	
Tiliqua occipitalis				X
Tiliqua rugosa	X	X	X	X
Tiliqua scincoides	X		X	
Family Typhlopidae				
Ramphotyphlops bituberculatus		X	X	
Ramphotyphlops endoterus	X			
Family Pythonidae				
Antaresia stimsoni	X			X
Morelia spilota metcalfei	X			X
Family Elapidae				
Brachyurophis fasciolatus	X			X
Demansia psammophis			X	
Furina diadema	X			
Pseudechis australis	X		X	
Pseudonaja nuchalis	X	X	X	
Pseudonaja textilis				X
Suta suta		X	X	
Family Hylidae				
Litoria caerulea	X		X	
Litoria rubella	X	X	X	
Family Myobatrachidae				
Limnodynastes tasmaniensis			X	
Neobatrachus centralis			X	
Neobatrachus sudelli	X		X	

Tessellated Gecko *Diplodactylus tessellatus*. There are Australian Museum records from White Cliffs, Fowlers Gap Research Station and Sturt National Park. It is probable the species occurs in the Park.

Narrow-banded Sand-swimmer *Eremiascincus fasciolatus*. There are Australian Museum records from Broken Hill and Sturt National Park. The Park is within the known distribution of the species.

Yellow-faced Whipsnake *Demansia psammophis*. The nearest Australian Museum record is 75km east of Wilcannia. These snakes are common in the Flinders ranges particularly along creeklines. Given the similarities between Mutawintji and the Flinders it is possible the species is in the Park, though not common.

Gerritsen (1976) provides a two page commentary on the reptiles and amphibians of the Park.

Species reported which were not confirmed by our survey were:

Eastern Stone Gecko *Diplodactylus vittatus*. The nearest record in the Australian Museum is from Tarawi, south of Broken Hill. We consider it unlikely that the species occurs in the Park.

Western Bluetongue *Tiliqua occipitalis* (vulnerable). The nearest Australian Museum record is from the Ivanhoe area, however a roadkilled specimen was identified near Little Topar ca 70km to the south (R. Foster, pers. obs.), and another was seen in Broken Hill (G. Swan, pers. obs.). The Gerritsen record could be in error for *Tiliqua scincoides*, which was recorded on several occasions around the gorges. The red soil plains, however, appear to be suitable habitat and it is probably present there.

Coral Snake *Brachyurophis australis*. Gerritsen's source of reference was probably Worrell (1970) who recorded *Brachyurophis australis* as the only shovel-nosed snake occurring in NSW. At that time the Narrow-banded Shovel-nosed Snake *Rhinelaps fasciolatus* (now *Brachyurophis fasciolatus*) was considered to be limited to WA and SA. However, we found *B. fasciolatus* at the Park during our surveys and consider it likely that Gerritsen's record refers to this snake as both species are superficially similar in appearance.

Eastern Brown Snake *Pseudonaja textilis*. The nearest Australian Museum record is 35 km from the entrance to the Park, and there are other records from Fowlers Gap Research Station, and Sturt National Park. Although we did not find this species it is highly likely that it occurs within the Park.

Eastern Bearded Dragon *Amphibolurus barbata*. This species does not occur in the region, but it was the name applicable to the Central Bearded Dragon *Pogona vitticeps* before the recognition of the latter species by Badham (1976) and erection of the genus *Pogona* for these species by Storr (1982). *Pogona vitticeps* was recorded in the Park during our surveys.

Children's Python *Liasis childreni*. This species does not occur in NSW, but it was the name applicable to the Large-blotched Python *Antaresia stimsoni* before the recognition of several species under this name by Smith (1985) and recognition of the genus *Antaresia* for these species by Kluge (1993). *Antaresia stimsoni* was recorded in the Park during our surveys.

Gerritsen commented that "...The Children's Python, *Liasis childreni* and Carpet Snakes, *Morelia spilotes* were once quite common in this area, but very few have been sighted over the past few years." Twenty years later this still appears to be the case as only one Carpet Python and two Large-blotched Pythons were observed during the surveys.

Habitat associations

Seven species (*Varanus tristis* (Fig. 6), *Egernia margaretae* (Fig. 7), *Morethia adelaidensis, Tiliqua scincoides, Antaresia stimsoni* (Fig. 8), *Morelia spilota metcalfei* and *Litoria rubella*) were found only within the gorges. A further three species (*Ctenophorus decresii* (Fig. 9), *Ctenotus strauchii* and *Egernia striolata*) were recorded within the gorges and on outlying rocky ridges. Nine species occurred in the gorges as well as other habitats. Some, such as *Heteronotia binoei* and *Morethia boulengeri,* were widespread. *Cryptoblepharus carnabyi,* however, was confined to eucalypts lining the creek banks and the floor of the gorges. Both *Lerista muelleri* and *L. punctatovittata* were most common in the creek beds and adjacent flats, but were found in the gorges and out on the red soil plains. Seven species (*Diplodactylus damaeus, Nephrurus levis, Ctenotus schomburgkii, Lerista labialis, Ramphotyphlops endoterus* (Fig 10), *Pseudonaja nuchalis,* and *Brachyurophis fasciolatus* (Fig. 11)) were only recorded on the red soil plains. Two species (*Ctenotus robustus* and *Furina diadema*) were only found on the creek flats, and another two species (*Ctenotus olympicus* and *Ctenophorus pictus*) were only found in blue bush habitat. Twelve species were recorded from more than one habitat outside the gorges.

While only three individuals of *Neobatrachus sudelli* were recorded, the tadpoles of this species were abundant in the gorges and ephemeral wetlands on the red soil.

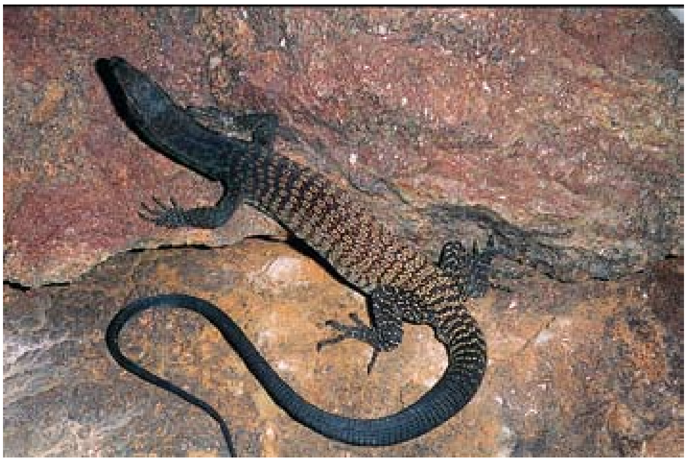

Figure 6. *Varanus tristis tristis.*

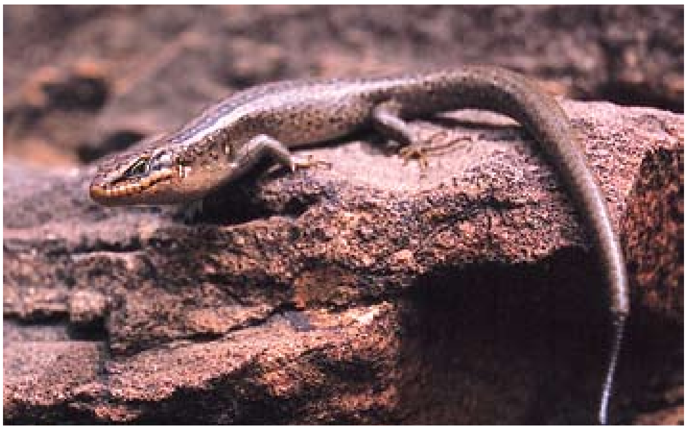

Figure 7. *Egernia margaretae.*

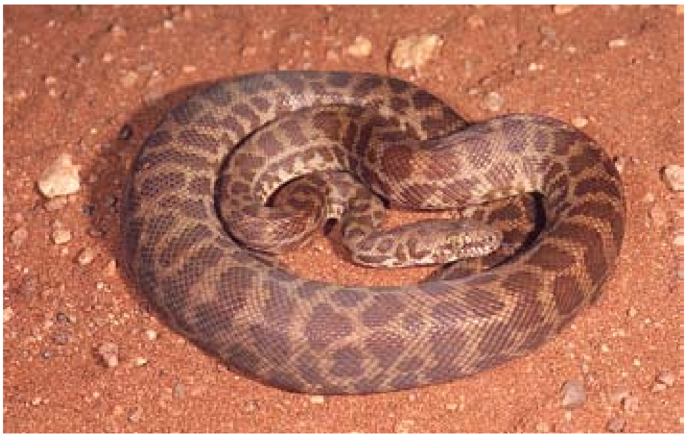

Figure 8. *Antaresia stimsoni.*

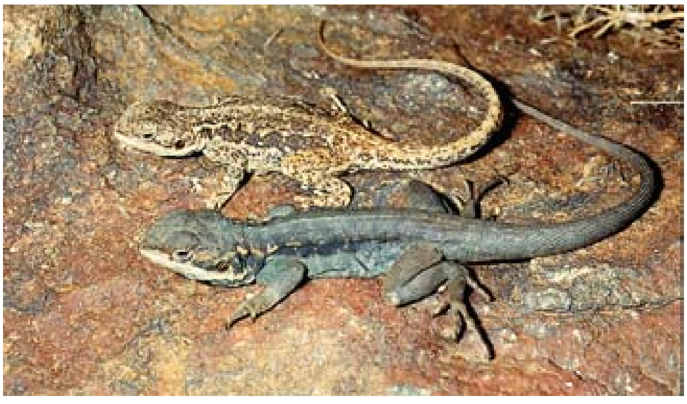

Figure 9. *Ctenophorus decresii..*

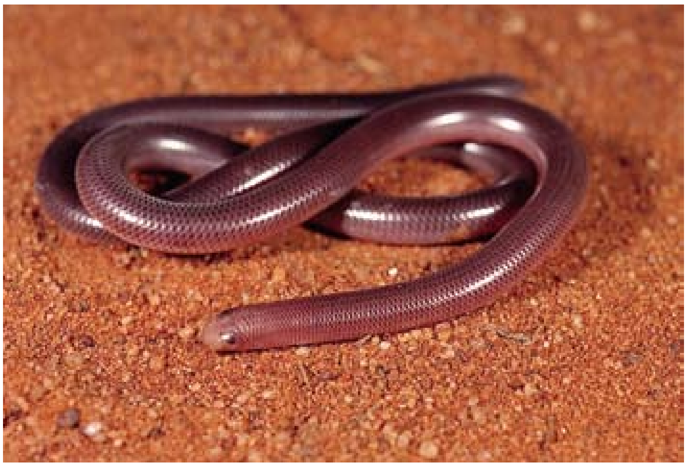

Figure 10. *Ramphotyphlops endoterus.*

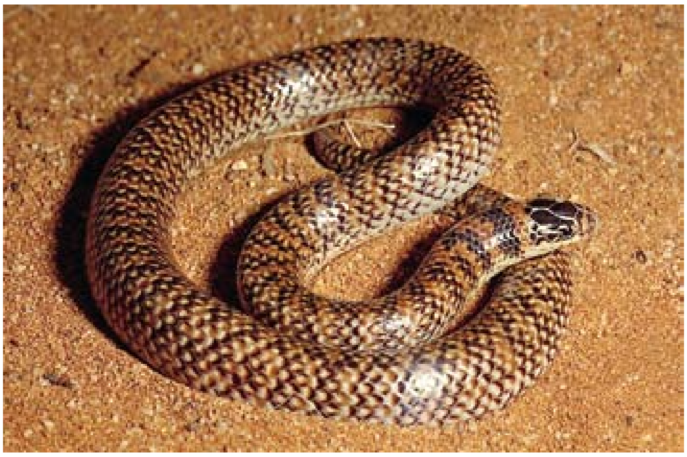

Figure 11. *Brachyurophis fasciolatus.*

Predator observations

Three instances of predation were observed during the surveys. A *Nephrurus levis* in the mouth of a fox cub was dropped when the fox was startled by the spotlight. A *Varanus tristis tristis* removed from a crevice had a gravid *Egernia striolata* in its mouth. An unidentified snake was seen being carried by a Peregrine Falcon to its nest in Old Mootwingee Gorge.

Survey technique results

As shown in Table 1, 522 animals from 34 species were recorded during opportunistic collecting, while 118 animals from 17 species were collected in pit traps, and 146+ animals from 13 species observed while spotlighting.

Of the 17 species recorded from pit traps, 3 were caught only by this method. These were the terrestrial geckos *Diplodactylus byrnei* and *Rhynchoedura ornata*, and the skink *Ctenotus olympicus*. Of the 13 species found when we spotlighted, 3 were only observed by this method. These were the ground-dwelling geckos *Diplodactylus damaeus* and *Nephrurus levis*, and the python *Antaresia stimsoni*. By comparison, 17 of the 34 species recorded during opportunistic collecting were only located by that method. While this included the larger lizards and snakes, a number of smaller reptiles including the single individuals of *Ctenophorus pictus, Ctenotus robustus* and *Morethia adelaidensis* were sampled.

Discussion

The benefit of using several survey techniques is demonstrated here. No one technique secured all 43 species. Opportunistic collecting was the most successful method, but this is probably due to the experience of the people involved and the technique of operating mainly in groups of three or four people. By having several people present, small fast moving lizards in particular were able to be caught and identified.

A rough analysis of the capture rates by all methods shows that for a total of 42 species recorded during 166 person days:

24 species (57%) were recorded in first 28 person days (17%) during Oct 1994.

25 species (59%) in total were recorded after 32 person days (19%) by Jan 1995.

30 species (71%) in total were recorded after 84 person days (51%) by April 1995.

32 species (76%) in total were recorded after 96 person days (58%) by October 1995.

42 species (100%) in total were recorded after 166 person days (100%) by November 1996.

One species (*Morelia spilota metcalfei*) is excluded from the species count because this was recorded by an AHS member on a separate visit. Although 59% of the recorded species were found in the first 19% of time, 10 species (24%) were recorded on the last of the five visits. This serves to demonstrate the dangers of ‘snapshot’, one-off surveys, which often do no more than record the species that would be expected to occur in an area.

Mutawintji National Park is of considerable conservation significance with four endangered species (*Egernia margaretae, Ramphotyplops endoterus, Ctenophorus decresii* and *Diplodactylus conspicillatus*), and three vulnerable species (*Antaresia stimsoni, Brachyurophis fasciolatus* and *Tiliqua occipitalis*) being recorded there.

As a result of our surveys, the occurrence of *E. margaretae* was confirmed in NSW (Swan and Foster 2000). This skink could well be the most endangered in NSW, with the known distribution consisting of a few hundred metres along one side of one gorge.

Goat populations fluctuated during our visits, but on some occasions were so abundant that they foraged around the tents in the camping ground. On all occasions they were visible and audible. Signs of their presence was only too apparent in broken and stripped vegetation, disturbance to rocks on the slopes and tops, and volumes of faeces on rocky ledges in depressions and crevices.

The effect of this habitat degradation on reptile populations, in particular *E. margaretae* and *C. decresii*, is not known. Murphy (1996) suggested that accumulation of goat pellets in escarpment areas may be a possible threat to the Broad-headed Snake *Hoplocephalus bungaroides*.

Ramphotyphlops endoterus was unknown in NSW until located in Mutawintji during our surveys (Shea *et al.* 2000). It has subsequently also been found in Sturt National Park to the north. Three individuals were located, all on red sandy soil. One was active on the surface at night, the other two were found during the day mating under a log.

Ctenophorus decresii is known from only three localities in NSW, Mutawintji, Koonenberry and rocky outcrops between Broken Hill and the South Australian border. One of us (GS) has visited Koonenberry and searched extensively in the areas west of Broken Hill. No C. *decresii* were found, although given the extent of Koonenberry Mountain it is possible they do occur there. However, also given that this species is conspicuous and obvious where it does occur, and this is certainly the case at Mutawintji, the population in the Park is here considered to be the largest in NSW.

Diplodactylus conspicillatus was not found during our survey, but is recorded in the NPWS Wildlife Atlas from the Park. One individual has been recorded at each of Sturt NP and Paroo Darling NP in pit traps during survey work by the AHS and Australian Museum. Three individuals were found just south of Wanaaring during spotlighting on foot (Jones 1991) with another individual found at the same spot previously.

Varanus tristis tristis appears to have two disjunct populations in NSW. One in the mid north-western region around the Darling River, and the second in the Broken Hill – Mutawintji region. Very few have been recorded elsewhere in recent years, which could make this a significant population.

The population of *Tiliqua scincoides* is the most westerly recorded for NSW, and appears to be quite isolated.

Sadlier and Pressey (1994) identified reptiles and amphibians of particular conservation concern in the Western Division of NSW. Several of these occur within the Park including *Ctenotus brachyonyx* (species of national significance, reliant on the western division); *Diplodactylus conspicillatus, Ctenotus strauchii varius* (rare in the western division); *Morelia spilota metcalfei* (insufficiently known, possibly vulnerable in the western division).

As shown in Figure 1, our surveys were quite localised in the southern area of the Park. We were primarily interested in what reptiles occurred in the ranges and adjoining creek beds and red soil plains. We did not have the vehicles or equipment to undertake surveys in the more northerly areas. Given the diversity found in the relatively small area covered and the number of endangered or vulnerable species found, a comprehensive survey of the whole Park over a number of years is warranted to identify the full complement of reptiles and amphibians within Mutawintji.

Comparisons with other surveys

A number of studies has been carried out in the arid/semi-arid zones of NSW and adjacent South Australia. These were at Mungo/Willandra (Sadlier and Shea 1989), Round Hill Fauna Reserve (Cogger 1984), Yathong Nature Reserve (Henle 1987), Culgoa floodplains (Dick and Andrew 1993), and Danggali Conservation Park in SA (Morley and Morley 1984). Direct comparisons between these studies are difficult due to differing pit trap techniques, sampling methods, climatic conditions and time of year, and total person hours involved.

We have compared the number of species recorded in each of the lizard and snake families by these studies (Table 4). Frogs were excluded as these had not been recorded in several of the studies. Our survey results compare closely with the Mungo/Willandra, Round Hill and Danggali studies, the notable difference being the pygopodids – we recorded none compared with 2-4 species at the other sites.

Table 4. Comparison of reptile species recorded by various studies.

	Mungo/ Willandra (1)	Round Hill NR (2)	Yathong NR (3)	Culgoa/Birrie (4)	Danggali CR (5)	Mutawintji NP (6)
geckos	8	6	4	5	9	9
pygopodids	2	4	-	1	4	-
agamids	4	3	3	3	5	4
varanids	1	2	2	2	1	2
skinks	16	15	13	8	18	18
blind snakes	2	2	-	-	2	1
pythons	1	-	-	-	-	2
elapids	5	4	1	4	8	4
Total	39	36	23	23	47	40

(1) Sadlier and Shea 1989. (4) Dick and Andrews 1993.

(2) Cogger 1984. (5) Morley and Morley 1984.

(3) Henle 1987. (6) This paper.

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References

Badham, J.A. 1976. The *Amphibolurus barbatus* species-group (Lacertilia: Agamidae). *Australian Journal of Zoology* **24**: 423-43.

Cogger, H.G. 1984. Reptiles in the Australian arid zone. In *Arid Australia* (Eds. H.G. Cogger and E.E. Cameron). Australian Museum, Sydney.

Dick, R. and Andrew, D. 1993. A vertebrate fauna survey of the Culgoa and Birrie River floodplains in NSW 1990-1992. *NSW National Parks & Wildlife Service Occasional Paper 14.*

Foster, R. 1993. A significant range extension of *Egernia margaretae personata? Herpetofauna* **23**: 35-6.

Gerritsen, J. 1976. *"Mootwingee – the Rockholes"*. The author. Tibooburra.

Henle, K. 1987. Herpetofauna of the Yathong Nature Reserve. *Australian Zoologist* **24**: 94-9.

Jones, P. 1991. A record of *Diplodactylus conspicillatus* in New South Wales. *Herpetofauna* **21**: 20-2.

Kluge, A.G. 1993. *Aspidites* and the phylogeny of pythonine snakes. *Records of the Australian Museum* Supplement 19.

Morley, T.P. and Morley, P.T. 1984. An inventory of the reptiles of Danggali Conservation Park. *Herpetofauna* **15**: 32-6.

Murphy, M.J. 1996. A possible threat to the Broad-headed snake *Hoplocephalus bungaroides*: degradation of habitat by the feral goat *Capra hircus*. *Herpetofauna* **26**: 37-8.

Roberts, J.D. 1997. Geographic variation in calls of males and determination of species boundaries in tetraploid frogs of the Australian genus *Neobatrachus* (Myobatrachidae). *Australian Journal of Zoology* **45**: 95-112

Sadlier, R.A. and Pressey, R.L. 1994. Reptiles and amphibians of particular conservation concern in the Western Division of New South Wales: a preliminary review. *Biological Conservation* **69**: 41-54.

Sadlier, R.A. and Shea, G.M. 1989. The reptiles of Mungo National Park and the Willandra Lakes Region. *Herpetofauna* **19**: 9-27.

Shea, G.M. Swan, G. and Sadlier, R. 2000. *Ramphotyphlops endoterus* (Waite, 1918), an addition to the typhlopid fauna of New South Wales. *Herpetofauna* **30**: 26-9.

Smith, L.A. 1985. A revision of the *Liasis childreni* species-group (Serpentes: Boidae) in Western Australia. *Records of the Western Australian Museum* **12**: 257-76.

Storr, G.M. 1982. Revision of the Bearded Dragons (Lacertilia: Agamidae) of Western Australia with notes on the dismemberment of the genus *Amphibolurus*. *Records of the Western Australian Museum* **10**: 199-214.

Swan, G. Shea, G. and Sadlier, R. 2004. *A Field Guide to Reptiles of New South Wales.* Reed New Holland, NSW.

Swan, G. and Foster, R. 2000. Confirmation of the occurrence of the skink *Egernia margaretae* in western New South Wales. *Herpetofauna* **30**: 48-9.

Worrell, E. 1970. *Reptiles of Australia.* Angus & Robertson, Sydney.